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*State of Maryland  
Program Elements  
for  
Modifications to the Vehicle Emission  
Inspection/Maintenance Program in Maryland*

**SIP # 23-04  
Part I**

**Prepared for:  
U.S. Environmental Protection Agency**

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# 1. Introduction and Purpose

Vehicle emissions testing is required in Maryland under the federal Clean Air Act because areas of the state exceed federal standards for ground-level ozone air pollution, causing approximately 6 million Marylanders to breathe unhealthy air. Ground-level ozone is formed in the atmosphere when a mixture of air pollutants reacts in heat and sunlight. Motor vehicles produce over one-third of the ozone-forming emissions of nitrogen oxides and volatile organic compounds in Maryland. The purpose of the Vehicle Emissions Inspection Program (VEIP) is to identify vehicles that are emitting excessive levels of pollutants and ensure that they are repaired.

The federal Clean Air Act (CAA) requires certain states, including Maryland, to implement an “enhanced” vehicle emissions inspection and maintenance (I/M) program to identify gasoline-fueled motor vehicles which exhibit excessive emissions of certain air pollutants. The enhanced I/M program is intended to help states meet federal health-based national ambient air quality standards (NAAQS) for ozone and carbon monoxide by requiring vehicles with excess emissions to be repaired. EPA fully approved Maryland's enhanced I/M program as meeting CAA requirements on October 29, 1999.

VEIP helps improve water quality as well as air quality, by reducing airborne emissions that cause nitrogen pollution of the Chesapeake Bay. A significant amount, about 30%, of total nitrogen emissions originates from motor vehicles.

Initially implemented in 1984, the VEIP has been revised several times over the years to reflect technological advancements in both vehicle emissions control systems and I/M testing methods.

This document describes current implementation of the VEIP and demonstrates that federal enhanced I/M performance standards are met. It also demonstrates that program changes made since the last VEIP SIP approval have not adversely affected the State’s ability to attain or maintain any of the NAAQS.

This document also satisfies the requirement for Maryland to certify that the enhanced program also meets “basic” I/M performance standards for the Maryland portions of the Baltimore, Washington, and Philadelphia Areas that in 2022 were “bumped-up” from marginal to moderate ozone nonattainment (Determinations of Attainment by the Attainment Date, Extensions of the Attainment Date, and Reclassification of Areas Classified as Marginal for the 2015 Ozone National Ambient Air Quality Standards, Federal Register /Vol. 87, No. 194 / Friday, October 7, 2022). The document demonstrates that the enhanced I/M program satisfies the requirements for a basic I/M program in these areas. See Parts II and IV of the document.

## 2. Program Elements

This section describes the current VEIP program elements.

### 2.1. Operating Agencies

The VEIP is jointly administered by the Maryland Department of Transportation Motor Vehicle Administration (MDOT MVA) and the Maryland Department of the Environment (MDE). Testing operations are conducted by a Contractor under contract to the State.

## 2.2. Legal Authority

Legal authority to fund, implement, administer, and operate the VEIP until the program is no longer necessary is provided in the Maryland Annotated Code by the Transportation Article at Title 23, Subtitle 2, and the Environment Article, Subtitle 1 and Subtitle 2, which are contained in Appendix 1.

## 2.3. Implementing Regulations and Interagency Agreements

Implementing regulations for the VEIP are in the Code of Maryland Regulations (COMAR) Chapter 11.14.08. Appendix 2 contains the documentation of regulatory actions on this chapter that became effective in 2009, 2018, and 2023.

The MDOT MVA and MDE each have responsibilities for administration and oversight of the VEIP, which are reflected in a funding agreement between the agencies. The agreement is renewed annually. The fiscal year 2023 agreement is included in Appendix 3.

The VEIP is operated by a Contractor under a legally binding State contract. Relevant portions of the contract are included in Appendix 3.

## 2.4. Applicability

VEIP requirements apply in the following metropolitan statistical areas (MSAs). The geographic boundaries of the program are the county boundaries.

- Baltimore, MD MSA, consisting of Anne Arundel, Baltimore, Carroll, Harford, Howard, and Queen Anne's counties, and Baltimore City. The 1990 census population of this area was 2,382,172.
- Washington, DC MSA, consisting of Calvert, Charles, Frederick, Montgomery, and Prince Georges counties in Maryland. The 1990 census population of the Maryland portion of this MSA was 1,789,029.
- Philadelphia-Wilmington-Trenton, PA-DE-NJ-MD CMSA, which includes Cecil County in Maryland. The 1990 census population of the Maryland portion of this CMSA was 71,347. The total population of the CMSA exceeded 100,000.
- Hagerstown, MD MSA, consisting of Washington County which had a 1990 census population of 121,393.

## 2.5. Performance Standard Modeling Analysis

In compliance with the CAA, EPA established an enhanced I/M performance standard, consisting of certain program elements that would provide a baseline of emissions reductions to be achieved in a state I/M program. States have the authority to determine the features of their I/M programs, as long as the program provides the same or greater level of reductions as the performance standard program would provide. States must demonstrate the equivalence by modeling their program, compared to the performance standard program, using EPA's latest mobile source emissions model.

MOVES3 was used to model both the VEIP area and the enhanced I/M performance standard in 2023, the attainment year of six years following the designation. The modeling demonstrates that the VEIP meets or exceeds the levels of emissions reductions that would be achieved by the performance standard. The modeling results are shown in Table X. Appendix 4 contains the modeling elements and input files.

**Table 1. Performance Standard Modeling Results**

Enhanced Performance Standard Modeling Results 2023 July Weekday Emissions Rates (grams/mile)								
Pollutant	Scenario 1 Existing Program		Scenario 2 Enhanced Performance Standard		Scenario 3 Performance Standard with Buffer		Overall Results Scenario 1 is Less Than Scenario 3	
	NOx	VOC	NOx	VOC	NOx	VOC	NOx	VOC
Baltimore Ozone Nonattainment Area	0.329	0.184	0.328	0.178	0.348	0.198	Pass	Pass
Washington, DC Ozone Nonattainment Area	0.317	0.191	0.316	0.186	0.336	0.206	Pass	Pass
Cecil County	0.567	0.197	0.566	0.192	0.586	0.212	Pass	Pass
Queen Anne’s County	0.499	0.159	0.498	0.155	0.518	0.175	Pass	Pass
Washington County	0.642	0.207	0.642	0.203	0.662	0.223	Pass	Pass

## 2.6. Network Type and Program Evaluation

The VEIP is a centralized, test-only system operated by a Contractor.

VEIP regulations provide for a Fleet Inspection Station (FIS) program where government agencies and private businesses meeting certain criteria may purchase the VEIP test equipment from the Contractor to conduct tests on vehicles owned and maintained by the fleet. The FIS program affected approximately 0.3% of all vehicles tested in the VEIP in calendar year 2022.

The VEIP regulations also include provisions for the implementation of a hybrid test system through the addition of decentralized testing outlets to the VEIP network. The expansion of the number of testing sites will significantly enhance motorist convenience.

To fulfill federal requirements for collecting I/M program evaluation data, the VEIP contract requires the Contractor to perform on-road remote sensing tests on a 1% sample of the VEIP vehicle population on a biennial basis. The remote sensing requirements of the contract are included in Appendix 5.

## 2.7. Adequate Tools and Resources

VEIP operations and oversight are funded through motorist inspection fees. Section 23-205 of the Annotated Code of Maryland (Appendix 1) provides authority for MDOT MVA and MDE to collect a motorist fee not to exceed \$14 for each vehicle to be inspected and allows payment of a specific portion of the fee to cover the cost of administration and enforcement of the emissions control program.

In fiscal year 2023, MDE employed approximately 12 positions to fulfill its VEIP obligations that include quality assurance monitoring of all elements of the testing system including test equipment auditing and extensive test data analysis. The obligations and funding levels are outlined in an annual joint agency VEIP Agreement with MDOT MVA. The fiscal year 2023 Agreement is contained in Appx 3.

In fiscal year 2023, MDOT MVA employed approximately 14 positions to provide public education and assistance, motorist compliance oversight, and VEIP Contractor oversight. Penalties in the form of liquidated damages that may be assessed for findings of Contractor noncompliance are in Appendix 3.

The Contractor employs approximately 175 positions for VEIP testing system management and operations.

## 2.8. Test Frequency, Motorist Convenience, Public Information, and Consumer Protection

Testing is conducted on a biennial cycle. At least one full-service VEIP station is located in each of the 14 jurisdictions affected by VEIP, for a total of 18 stations. The Contractor is required to adhere to motorist wait time limits at the stations and the state can impose penalties if the requirements are not met, as contained in Appendix 5. Ten self-service VEIP kiosks provide additional convenient motorist test options. The VEIP regulations provide for implementation of a hybrid testing network through the addition of decentralized testing outlets, to further enhance motorist convenience.

MDOT MVA provides [online services](#) for motorists to learn more about VEIP testing requirements and test locations, and access specific information about their vehicle test status. MDE also offers information for the public about VEIP on its [website](#).

Testing requirement information is also provided in the Vehicle Emissions Inspection Notice sent to motorists. The Vehicle Emissions Inspection Certificate issued by the Contractor upon vehicle testing contains additional important motorist information including a notice of potential availability of vehicle manufacturer warranty coverage for vehicles failing the VEIP test. Customer Service Representatives are available at all central stations to assist motorists.

MDE also provides a Certified Emissions Repair Facility (CERF) program to ensure motorists have access to repair facilities with the diagnostic equipment and technical information necessary to properly diagnose and repair vehicles with emissions problems and employ technicians who possess the highest nationally recognized level of emissions system repair proficiency through certification by the National Institute for Automotive Service Excellence (ASE).

Further, the VEIP regulations provide for the implementation of a Motorist Assistance Center (MAC) component of the program. MACs will include an emissions repair specialist available at the central stations to assist both motorists and the repair industry with getting the correct repairs completed in a timely fashion and help ensure effective, lasting emissions repairs are performed. The improvements in repair success will carry through multiple VEIP test cycles, reducing overall fail rates and customer inconveniences, and ensuring continued air quality progress. This is an especially important component of the program, given the complexity of modern vehicle emissions technology. MACs will improve the repair industry’s ability to maintain vehicles, and help more people get the repairs needed to pass their VEIP test.

The VEIP contract requires the Contractor to provide motorists with information on emissions-related recalls if US EPA provides a database of emissions-related recalls.

## 2.9. Vehicle Coverage

**Table 2. Subject vehicles.**

Gross Vehicle Weight (pounds)	Vehicle Model Year	Test Type
Less than or equal to 8,500	1996 and newer	On Board Diagnostics (OBD) test
8,501 - 14,000	1977 - 2007	Idle exhaust emissions test, Catalytic converter check, and Gas cap leak test
8,501 - 14,000	2008 and newer	On Board Diagnostics (OBD) test
14,001 - 26,000	1977 and newer	Idle exhaust emissions test, Catalytic converter check, and Gas cap leak test

Exempted vehicles are specified in COMAR 11.14.08.04. Requirements for initial testing of a new, not previously registered vehicle are specified in COMAR 11.14.08.05. The complete COMAR chapter 11.14.08 is in Appendix 2.

Maryland offers voluntary VEIP testing for non-Maryland registered vehicles that meet the criteria in Table 2.

## 2.10. Test Procedures and Standards, Test Equipment, and Test Equipment Quality Control and Maintenance

Statutory authority to establish testing procedures and standards is contained in Appendix 1 and implementing regulations for test procedures and standards and test equipment functionality, performance, security, quality control, and maintenance are contained in Appendix 2.

Appendix 3 contains contractually binding requirements of the Contractor to comply with proper test procedures and standards, and test equipment quality control and maintenance, including penalties in the form of liquidated damages if test system performance requirements are not met.

Appendix 5 contains test procedures and standards, test equipment descriptions, and specifications, and test equipment quality control requirements.

## 2.11. Repair Waivers

Appendix 1 contains legal authority to provide repair waivers for motorists who demonstrate efforts to repair their vehicles to pass VEIP testing. Other exceptions are provided for motorists who are senior citizens, disabled, or out of state due to active military service and meet certain requirements (Appendix 1). Implementing regulations for repair waivers and the other exceptions are in Appendix 2. MDE, MDOT MVA, and the Contractor operate a quality control program to ensure that the legal requirements for repair waivers are met. Only trained and certified Contractor management personnel and MDOT MVA personnel are authorized to issue repair waivers. Individual inspectors at central stations and FIS may not issue repair waivers.

Appendix 5 contains repair waiver procedures.

## 2.12. Motorist Compliance Enforcement

Appendix 2 contains the legal authority for Maryland to suspend registration of non-complying vehicles and subsequently deny the reregistration, and to require motorists to file their current registration address with the MDOT MVA.

Initial test notices are mailed to motorists in advance of the vehicle test date. If the vehicle is not tested within seven days after the due date, a warning letter is mailed to the vehicle owner stating the vehicle must be tested within 30 days or the registration will be suspended. If the vehicle is not tested within 30 days, the registration is suspended. When it is time for registration renewal, a letter is mailed to the motorist informing them that their registration will not be renewed until the VEIP test requirements are satisfied.

## 2.13. Quality Assurance

MDE and MDOT MVA, along with the Contractor, operate a multi-faceted VEIP test system quality assurance effort that includes:

- Extensive fraud prevention requirements for test equipment, operational test software, and data handling;
- Inspection personnel training and certification requirements;
- Test equipment audits;
- Station compliance audits;
- Personnel performance audits;
- Video surveillance image review; and
- A test data analysis and feedback system that provides for ongoing test system improvements when shortcomings are identified.

Regulations providing for the test system quality assurance elements of the VEIP are contained in Appendix 2. Quality control and staff training requirements of the operations contractor are contained in Appendix 5.

#### Test Equipment Audits

MDE performs periodic quality assurance audits of the test equipment at the central stations, kiosks, and FIS. Collectively among these test sites, MDE performs approximately 3,000 test equipment audits per year. Detailed reports of the results of the audits are provided to EPA on an annual basis as required by federal regulations.

#### Contractor Compliance Audits

MDOT MVA conducts approximately 300 unannounced compliance audits of VEIP stations and kiosks on an annual basis.

The Contractor's Customer Service Representative performs ongoing audits of all centralized test lanes on an hourly basis and reports the audit data to the MDOT MVA. Appendix 5 contains the audit procedures.

Video surveillance digital video files of the testing process are generated in all test lanes. The Contractor conducts approximately 1,000 surveillance audits annually, many in follow-up to issues arising from extensive test data review and analysis that MDE and MDOT MVA conduct on an ongoing basis.

Investigations of test data, including covert visual performance audits and review of video files, are performed by MDE and MDOT MVA personnel and the Contractor when suspected incidents of fraudulent or unacceptable testing practices occur.

#### Vehicle Testing Software Functionality and Test Data Quality Monitoring

MDE monitors testing software functionality and system performance through data analysis to ensure the integrity of the testing process. Detailed analyses of vehicle test records and quality assurance data are conducted to examine accuracy, consistency, and trends, and to identify

potential problems early so corrections can be promptly applied. Special statistical analyses are also performed as needed to evaluate specific technical and operational aspects of the VEIP. These efforts have prompted the development and implementation of numerous testing software revisions, both to correct identified problems as well as introduce related enhancements. MDE prepares monthly data analysis reports and provides them to MDOT MVA and the Contractor.

#### VEIP Technical Committee

MDE and MDOT MVA's quality assurance monitoring and data analysis efforts serve as sources of vital information for the VEIP Technical Committee, which is comprised of representatives of MDE, MDOT MVA, and the Contractor. The Committee is founded on a contractual requirement for the Contractor to hold regularly scheduled technical meetings with the State to develop plans for achieving continuous improvement in testing system performance and accuracy, customer service activities, and other technical and programmatic issues related to VEIP operations and management.

### 2.14. Enforcement Against Contractors, Stations, and Inspectors

Penalties for findings of Contractor noncompliance are stipulated in the contract with the Contractor. The State has authority to impose liquidated damages as contained in Appendix 5. Enforceable items include:

- Failure to commence the operation of the program at all central VEIP stations by the contractually required date;
- Excessive motorist wait times at central VEIP stations;
- Failure to properly transfer vehicle test records to the State;
- Performing vehicle inspections with instruments which should have locked out from testing due to quality control parameters out of range or a missed periodic calibration check deadline;
- Performing vehicle inspections with instruments for which quality assurance procedures were not conducted as required;
- Performing vehicle tests with incorrect test parameters, including test standards;
- Failure to submit or update the mandatory Quality Assurance and Maintenance Plan;
- Failure to submit equipment quality assurance or maintenance records;
- Failure to promptly repair elements of the testing system upon any hardware or software failure and resume normal operations;
- Intentional use of improper test procedures, or improperly passing a vehicle for any required portion of the vehicle inspection;
- Failure to adhere to proper vehicle test procedures;
- Failure to provide a qualified audit technician at a VEIP station for State personnel to perform an audit;
- Failure to comply with the Contractor's Traffic Management Plan, inside or outside of the VEIP station building;
- Failure to adhere to the required VEIP station operating schedule;
- Failure to adhere to FIS equipment maintenance and repair requirements and response times; and

- Findings of other serious violations of rules or procedural requirements, or findings of gross neglect that directly affect emissions reduction benefits.

## Acronyms and Abbreviations

1. CAA: Clean Air Act
2. CFR: Code of Federal Regulations
3. CO: Carbon Monoxide
4. gpm: Grams Per Mile
5. HC: Hydrocarbons
6. HDGV: Heavy Duty Gasoline Vehicle
7. I/M: Vehicle Emissions Inspection and Maintenance
8. LDGT: Light Duty Gasoline Truck
9. LDGV: Light Duty Gasoline Vehicle
10. LEV: Low Emission Vehicle
11. MY: Model Year
12. NAAQS: National Ambient Air Quality Standards
13. NOx: Nitrogen Oxides
14. OBD: On-Board Diagnostics
15. OTR: Ozone Transport Region
16. ppm: Parts Per Million
17. ROP: Rate of Progress
18. SIP: State Implementation Plan
19. USEPA: United States Environmental Protection Agency
20. VMT: Vehicle Miles Traveled
21. VOC: Volatile Organic Compounds
22. ZEV: Zero Emission Vehicle